

08:30 - 11:30

Morning Session - Open

08:30 **Update on International Context 30'**

Update on the German environment
Update on the European Strategy

Speakers: Andreas Schaefer, Elke Aschenauer (BNL)

Material: [Schaefer](#)  [Slides](#) 

09:00 **Science Issues 45'**

Physics Menu, Performance Requirements, Community, EIC Users Group role in NAS Study

Speaker: Abhay Deshpande (Stony Brook University)

Material: [Slides](#) 

09:45 **R&D Issues 30'**

What a skeptical Committee will look for?

Speaker: Ferdinand Willeke (BNL)

Material: [Slides](#) 

10:15 **Coffee 15'**

10:30 **Documentation Center 30'**

Scope & Organization of the Documentation Center: Configuration Control, Science, Simulations, CD Documentation, WBS, WBS Dictionary, PEP, PMP

Speaker: Ferdinand Willeke (BNL)

Material: [Slides](#) 

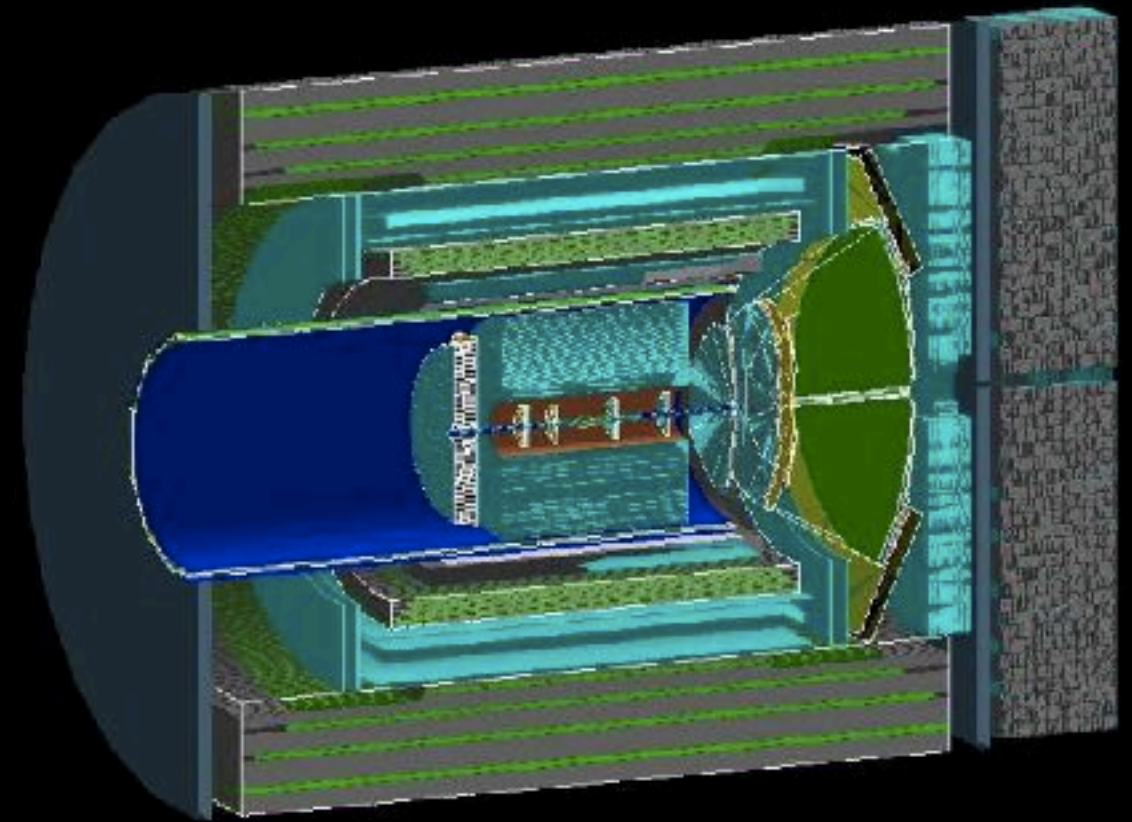
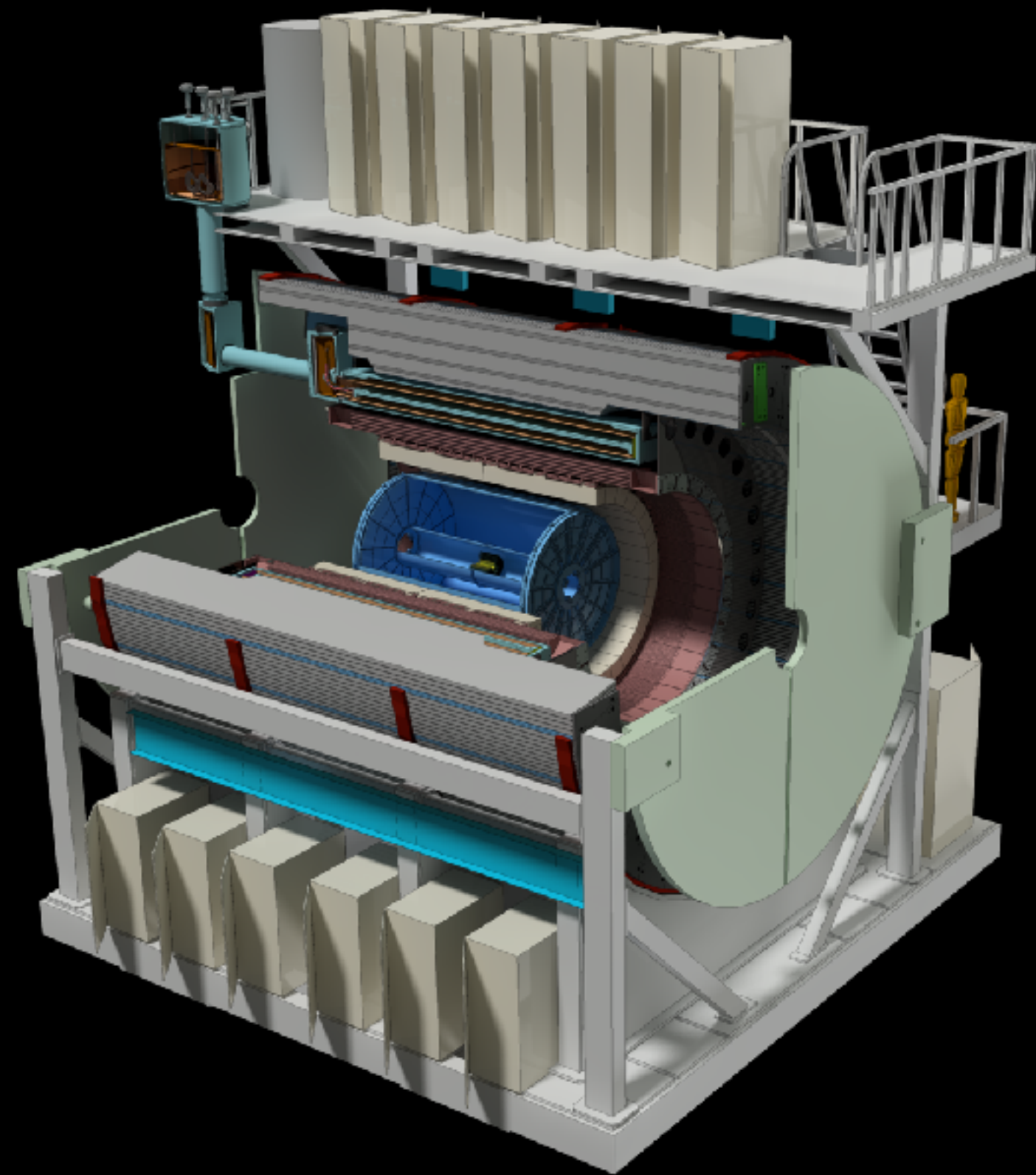
11:00 **Plans for sPHENIX evolution to eRHIC 30'**

Detector design considerations, collaboration building

Speaker: David Morrison (BNL)

Material: [Slides](#) 





Plans for sPHENIX evolution to eRHIC

Dave Morrison (BNL)

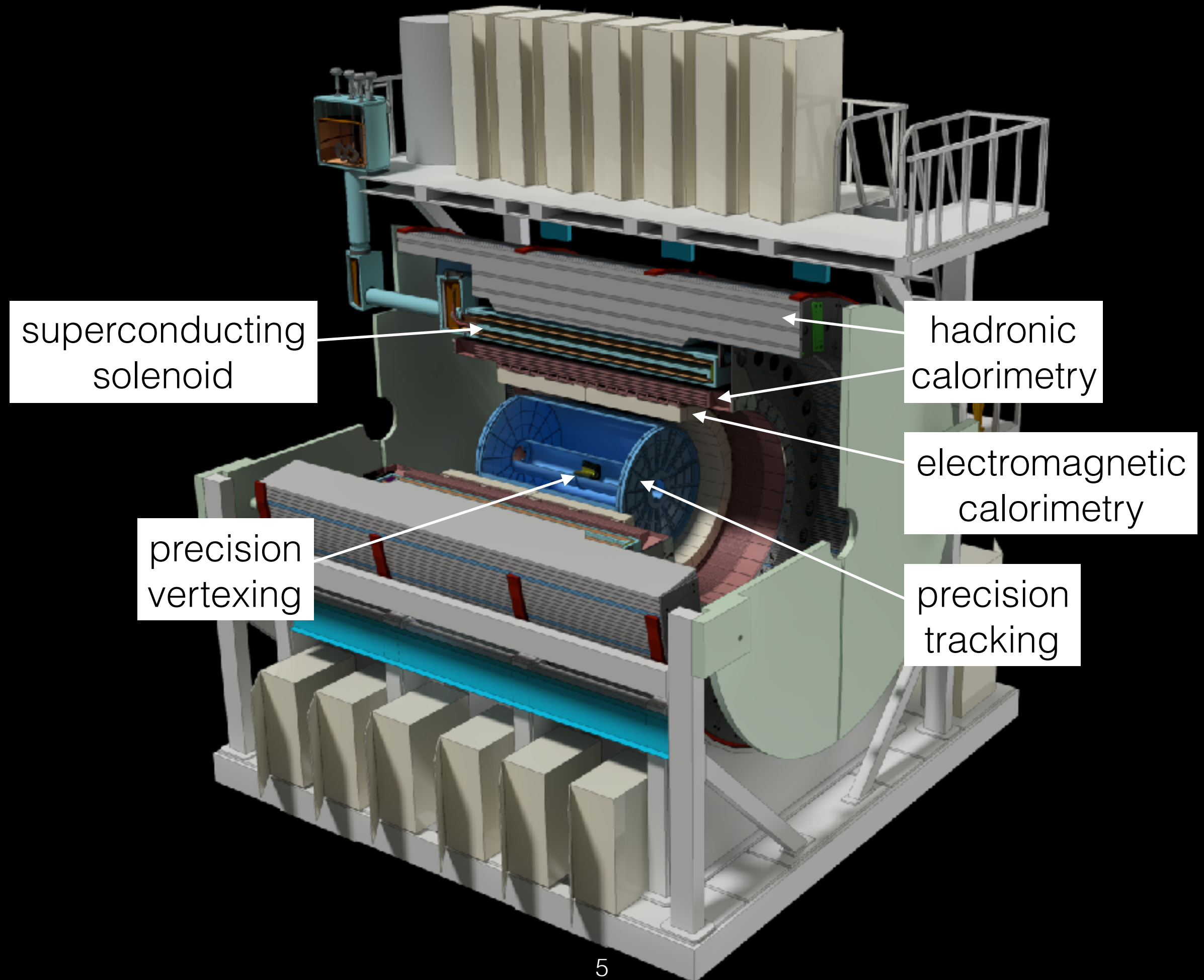
From Berndt ...

It would be useful if you prepare a few slides, but you should leave ample time for discussion within your allotted time. We would like you to not only focus on hardware issues but also on the main initial science targets of the detector and, importantly, on collaboration building or expanding issues, i.e. how to begin involving scientists who have little or no interest in heavy ion physics and may not have participated in the RHIC program before.

sPHENIX

- major upgrade to PHENIX:
 - large superconducting solenoid
 - large acceptance, deep calorimetry
 - precision tracking and vertexing
 - high rate capability
- reuses significant parts of infrastructure
- emphasis on signals neither PHENIX nor STAR have complete capability to study – which have been informative at the LHC and benefit from complementary measurements at RHIC energies
 - intra- and inter-jet structure
 - Upsilon family of $b\bar{b}$ mesons
 - jets originating from heavy-quarks

} observables sensitive to mass
and distance scales in the
quark-gluon plasma



Six-year history of development

sPHENIX Concept in the PHENIX Decadal Plan (charged by ALD Steve Vigdor):
October 2010

Original proposal <http://arxiv.org/abs/1207.6378>: July 2012
(new superconducting solenoid & optional additional tracking)

BNL Review (chaired by Tom Ludlam) of sPHENIX proposal: October 2012

Updated sPHENIX proposal: October 2013

BNL Review (chaired by Sam Aronson) of “ePHENIX” LOI: January 2014

“ePHENIX” White Paper (<http://arxiv.org/abs/1402.1209>): February 2014

Future Opportunities in p+p and p+A with the Forward sPHENIX Detector: April 2014

Updated proposal, submitted to DOE: June 2014 (incorporation of Babar magnet
and tracking)

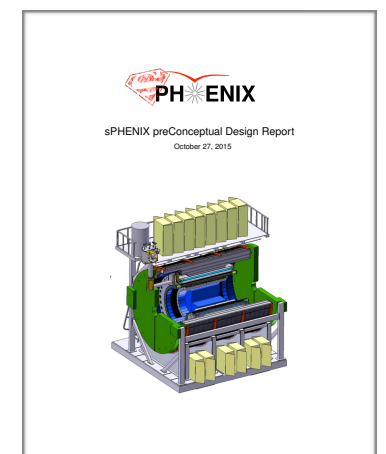
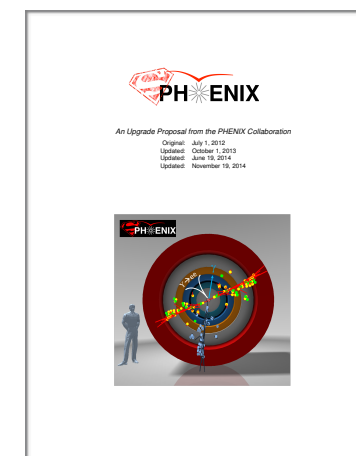
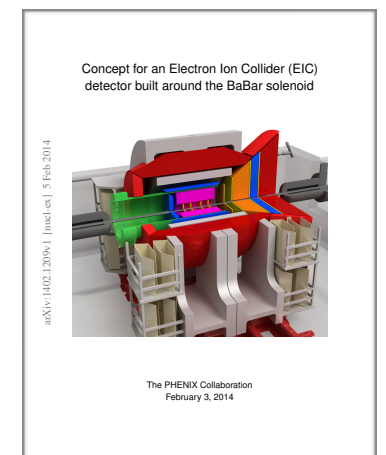
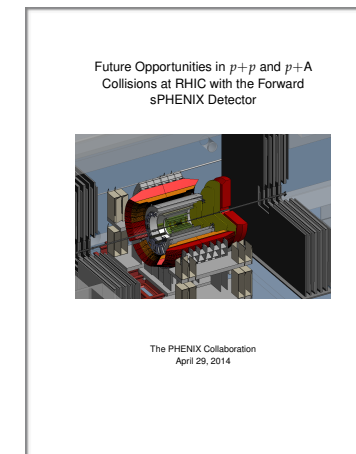
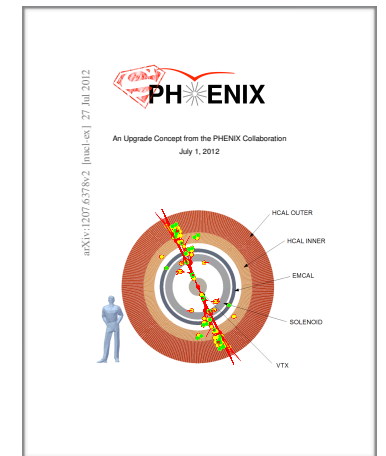
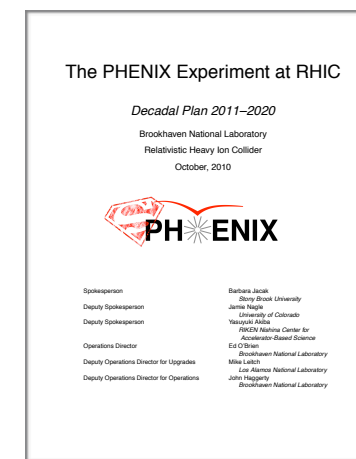
DOE Science Review: July 2014

Updated Proposal <http://arxiv.org/abs/1501.06197> : November 2014

DOE Science Review (chaired by Tim Hallman): April 2015

sPHENIX pCDR: November 2015

sPHENIX CD-0: September 2016



By initial collaboration meeting, December 2015

57 institutions signed up: Abilene Christian, Augustana College, Banaras Hindu University (India), Baruch College, CUNY, BNL and BNL (PHENIX), UC-Davis, UCLA, UCR, Chonbuk National University (South Korea), Colorado, Columbia, Joint Czech Group (Charles University): Prague Czech Technical University, Prague Institute of Physics, Czech Academy of Sciences – Prague; University of Debrecen, Florida State, Georgia State, Howard University, Houston, sPHENIX (Hungary), Illinois – U.C., Institute of Nuclear Research, Russian Academy of Sciences, Moscow, Iowa State, University of Jammu (India), JAEA (Japan Atomic Energy Agency), Korea University, National Research Centre “Kurchatov Institute”, Lehigh, LLNL, LANL, Maryland, MIT, Michigan, National Research Nuclear University (Moscow Engineering Physics Institute), Muhlenberg College, Nara Women’s University (Japan), New Mexico State, University of New Mexico, ORNL, Ohio University, Institut de Physique Nucléaire d’Orsay, Petersburg Nuclear Physics Institute (National Research Centre “Kurchatev Institute”), IHEP (Protvino), RIKEN/RBRC, Rikkyo University, Rutgers, Stony Brook, Saint-Petersburg Polytechnic University, Tennessee - Knoxville, Texas - Austin, Tokyo Institute of Technology (Tokyo Tech, TITech), University of Tokyo (Center for Nuclear Study), Institute of Physics - University of Tsukuba, Universidad Técnica Federico Santa María - Valparaíso (Chile), Vanderbilt, Wayne State, Weizmann Institute, Yale, Yonsei University (Korea).

total of nearly 200 scientists

Gunther Roland (MIT) and DPM elected co-spokespersons

Collaboration building

- Most PHENIX institutions joined sPHENIX – but not all
- ~20% of sPHENIX institutions were not on PHENIX
- Currently conducting collaboration census – expect this to be done annually
- US institutions with DOE (HI and ME) and NSF funding. Continued strong Japanese collaborations – clearer now that we have CD-0. Strong Russian collaborations. Few western European institutions.
- Maintaining the collaboration is equally an issue

Actions within the collaboration

- sPHENIX by-laws do not forbid being in other collaborations simultaneously
 - Jamie Nagle, DPM worked through spokesperson/ALD channel to clarify that STAR & PHENIX by-laws allow this too
 - many sPHENIX HI groups are involved in LHC experiments
 - many sPHENIX ME groups are involved in JLab experiments
- No appointed deputies yet or completely filled executive council. Provides flexibility in the early going as we attempt to grow the collaboration.
- Formed “topical group” on cold QCD (Christine Aidala (Michigan), Nils Feege (SBU))
- Plenary talk (by Abhay Deshpande (SBU)) to highlight evolution to EIC at most recent collaboration meeting

sPHENIX Executive Council

Guthier Roland (MIT) [CMS] (ex officio)

Dave Morrison (BNL) [PHENIX] (ex officio)

Ed O'Brien (BNL) [PHENIX] (ex officio)

Megan Connors (Georgia State) [PHENIX] (junior)

Sarah Campbell (Columbia) [PHENIX] (junior)

Tom Hemmick (Stony Brook) [PHENIX]

John Lajoie (Iowa) [PHENIX]

Anne Sickles (UIUC) [PHENIX]

Bill Zajc (Columbia) [PHENIX]

Joern Putschke (Wayne State) [ALICE, STAR]

Jamie Nagle (Boulder) [sPHENIX]

Huan Huang (UCLA) [STAR]

Itaru Nakagawa (RIKEN) [PHENIX]

Christine Aidala (Michigan) [PHENIX]

Outreach and engagement strategy

- open approach to discussions, meetings, code development: BNL hosted “Indico” for meetings, BlueJeans for conferencing, Dropbox for sharing, “GitHub” for collaborative code development, etc
 - Lab could be very helpful with this: enterprise licenses for Dropbox, Slack, GitHub; updated versions of collaborative software; infrastructure for “single sign-on” authentication
- “workfests” – organized 2-3 day meetings of 10-20 people to work on a focused topic
 - e.g., “forward sPHENIX” workfest at ISU, March 2016. STAR colleagues, Elke Aschenauer and Ernst Sichtermann; Kondo Gnanvo (UVA, JLab experiments SoLID and SBS)
 - Continued – even expanded – Lab support for workshops and visitors could accelerate this

Outreach and engagement strategy

- deliberate encouragement and support
 - e.g., letters in support of JSPS proposals for silicon (ultimately not successful, but lack of CD-0 may have played a significant role)
 - circulating experiences regarding interactions with funding opportunities (e.g., NSF, DOE ME)
- involvement in physics documents. E.g, “The RHIC cold QCD plan” by Elke Aschenauer et al, includes six authors on sPHENIX
- opportunistic engagement
 - e.g., visit to BNL this year by group from Saclay led to serious discussions with SBU about NSF/France joint funding

Outreach and engagement strategy

- providing readily referenceable eRHIC detector design and specs (arXiv:1402.1209)
- contributed to collaboration between Jin Huang (BNL) with SBU group with natural focus on JLab (Krishna Kumar, Yuxiang Zhao, Abhay Deshpande, Seamus Riordan) on EIC study of EW and BSM physics
- described in Yuxiang Zhao's POETIC 7 slides earlier this week (<https://indico.bnl.gov/conferenceOtherViews.py?view=standard&confId=2095>)

Attraction of technology

- many benefits from EIC R&D program – a number of technologies in sPHENIX baseline are the same as targeted for an EIC detector (EMCal, TPC, MAPS)
- discussion with Saclay group has focused on micropattern gas detectors and electronics related to the TPC
- encouraging a beyond-baseline proposal to DOE to fully build MAPS inner tracker (likely LANL, MIT, LBNL). LANL LDRD already in effect.

cold QCD topical group

- co-conveners: Christine Aidala (Michigan), Nils Feege (SBU)
- broad portfolio – spin physics with baseline sPHENIX, physics opportunities with forward instrumentation in $p+p$ and $p+A$, evolution to EIC detector – possibility of additional co-conveners
- provides an official “home” for potential new collaborators with this particular physics focus
 - regular meetings using Indico, bluejeans (will be made compatible with corresponding STAR meetings)
 - input into simulations work
 - voice at bi-weekly general meetings, collaboration meetings, directly with co-spokespersons

Setting the stage: 2014 LOI studies

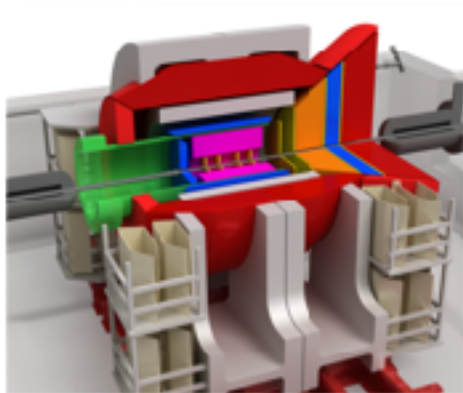
Maximum
beam energies

e	10 GeV
p	255 GeV
Au	100 GeV / nucleon

e+p Design luminosity
(10 GeV on 255 GeV)

$$10^{33} \text{ cm}^{-2}\text{s}^{-1}$$

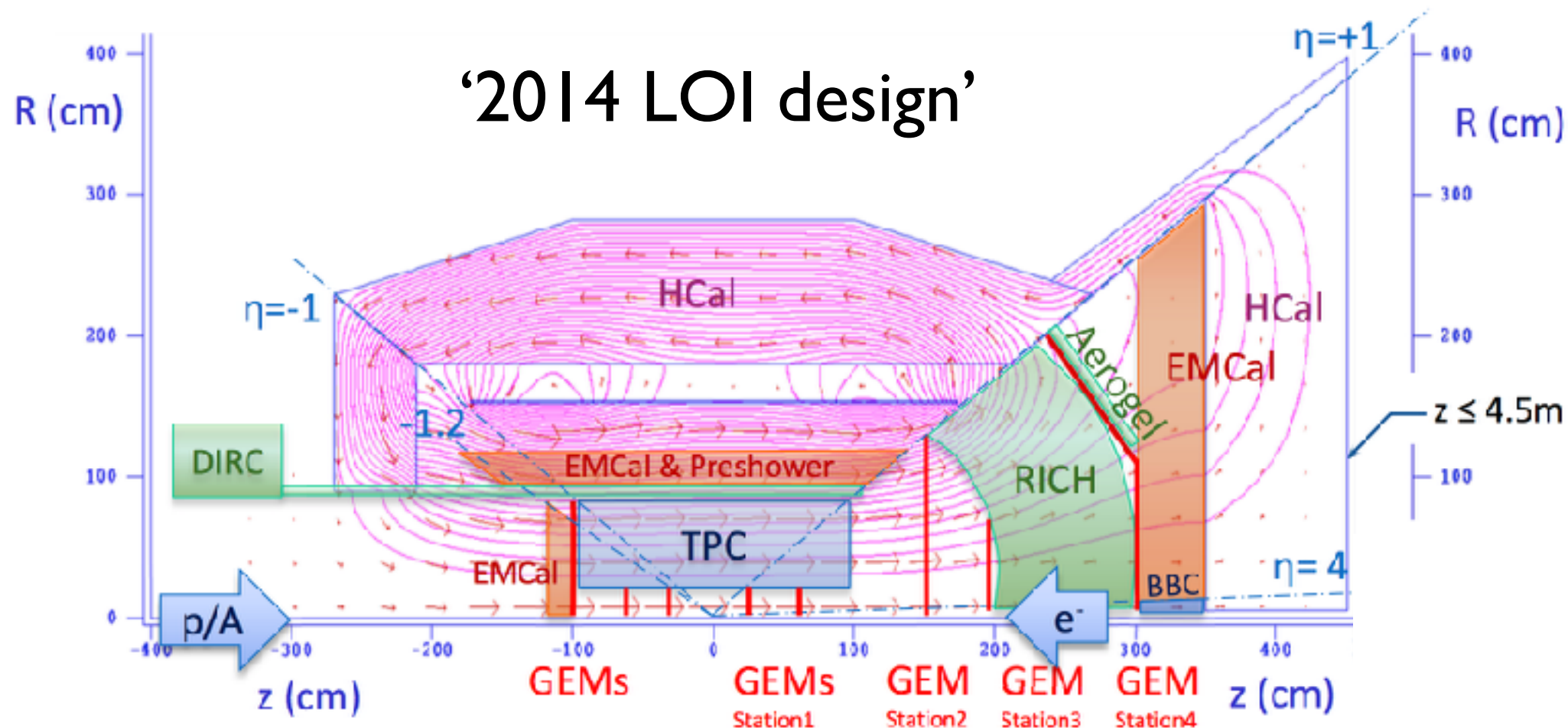
Concept for an Electron Ion Collider (EIC)
detector built around the BaBar solenoid

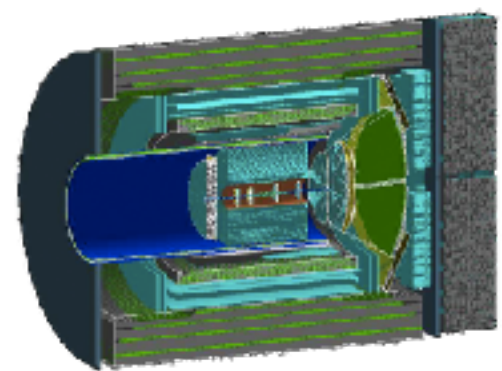


The PHENIX Collaboration
February 3, 2014

[arXiv:1402.1209v1]

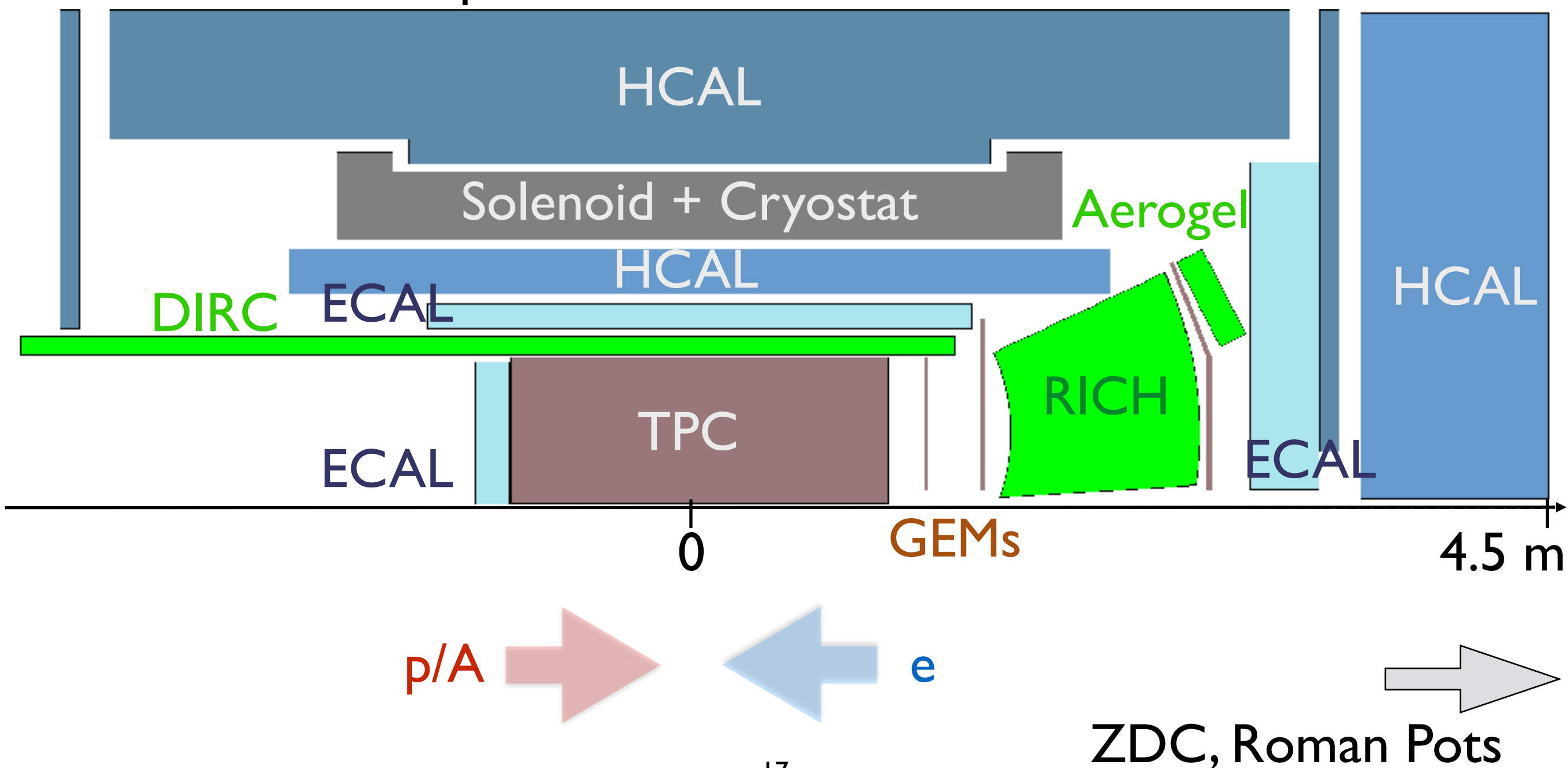
'2014 LOI design'





EIC Detector Concept

'2016 revised concept'



updating the 2014 LOI

- concept in 2014 envisioned asymmetric magnetic structure with large “hadron” arm
- recent focus is on detector more compatible with sPHENIX baseline
- accelerator specs have changed significantly
- technological progress may alter preferred approach
- no specific timeline for producing update, but it is an opportunity for engaging groups – both theory and experiment

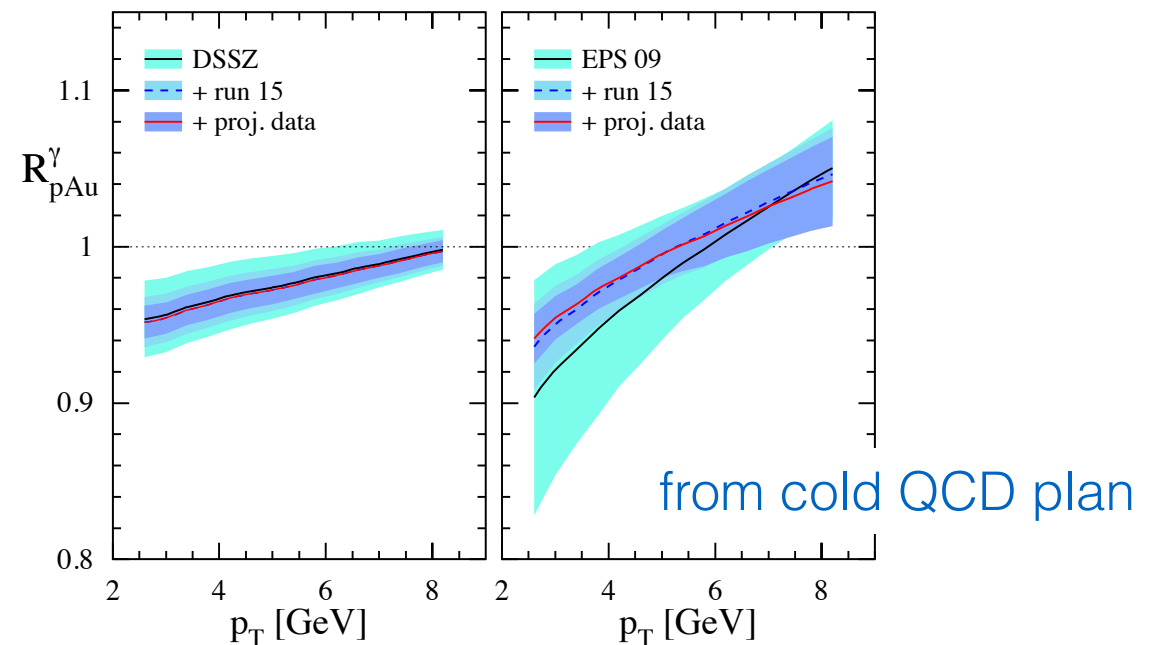
Encouraging signs?

- CD-0 approval should facilitate discussions with colleagues worldwide
- Ascendancy of TPC option has led to great SBU engagement – ties to JLab and EIC
- Potential of spin measurements with sPHENIX baseline has brought in MIT ME (e.g., Richard Milner, Bob Redwine, Jan Bernauer, Doug Hasel) and Temple Univ. (Bernd Surrow)
- CD-0 and other factors have led LBNL and also UC Berkeley to indicate intention to join collaboration

Challenges

- sPHENIX baseline lacks key forward instrumentation, which rules out many measurements of interest

- Drell-Yan and UPC in p+A
- long range rapidity correlations
- nuclear fragmentation functions



- this is an impediment to attracting a number of potentially interested groups
- sPHENIX is being pursued in a very resource constrained environment, both in terms of money and in terms of schedule. Distribution of funds to engage groups (particularly smaller groups) and realistic discussion of additional instrumentation are necessary, but quite complex.

Berndt's charge "... how to begin involving scientists [whose primary interest is other than heavy-ion physics]"

In addition to maintaining vital connection with scientists who are already members of the collaboration

Joining, or indicating intent, to join the collaboration

- MIT: Richard Milner, Bob Redwine, Jan Bernauer, Doug Hasel
- Temple: Bernd Surrow
- LBNL: Ernst Sichtermann

Potential, or actual, technical collaboration, or more

- Saclay: Franck Sabatié, Maxence Vandenbroucke
- BNL: ME and STAR groups

Studies using an EIC detector based on sPHENIX

- SBU: Krishna Kumar, Yuxiang Zhao, Seamus Riordan